**COURSE TITLE: MEDICAL BIOCHEMISTRY**

**RADIOLOGY 2ND SEMESTER SECTION A**

**LAB ASSIGNMENT**

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**Q1. EXPLAIN THE PROCESS OF URIC ACID FORMATIOIN.**

**Ans) URIC ACID FORMATION:**

* The formation of uric acid is through the enzyme xanthine oxidase, which oxidizes oxypurines.
* Uric acid is formed by to the breakdown of nitrogenous bases present in nucleic acid.
* Nucleic acid is macromolecule, it is an organic compound present inside the cells.

**METABOLISM OF NUCLEIC ACID:**

* A nitrogenous base is of two types pyridine and purine.
* The catabolism of purine leads to the formation of uric acid.
* Purine is a large molecule, the nitrogenous bases of it are double ring structure adenine and guanine.
* Adenine and guanine passes through the same steps and formed a uric acid after passing through certain steps.

**1ST STEP:**

* Adenosine mono phosphate is composed of nitrogenous bases, phosphate and sugar.
* One inorganic phosphate is removes from adenosine monophosphate in the presence of nucleotidase enzyme.
* This upon breakdown converts into adenosine which consists of nitrogenous base + sugar.

**2ND STEP:**

* In the next step the ammonia (NH3) group from adenosine is removes in the presence of an enzyme adenosine deaminase and is converted into inosine.
* Inosine consists of nitrogenous base and sugar.

**3RD STEP:**

* In this step the sugar group from inosine is removed in the presence of an enzyme nucleoside phosphorylase.
* The inosine is converted into a compound known as hypoxanthine.

**4TH STEP:**

* In this step an oxygen molecule is added into hypoxanthine and formed a molecule known as xanthine by an enzyme xanthine oxidase.

**5TH STEP:**

* In this step one more oxygen molecule is added in xanthine by an enzyme xanthine oxidase and formed a molecule known as uric acid.



**Q2. DISCUSS ALL THE PROTEIN COMPLEXES USED IN ELECTRON TRANSPORT CHAIN.**

**PROTEIN COMPLEXES:**

* Where on the inner membrane there are four attach protein complexes.
* These protein complexes process the ETC.
* The coenzyme Q is present between complex 1 and 2, the molecules of cytochrome is present between 3 and 4 complex protein.
* In the cytochrome molecule there are four arranged molecules like cyt b, cyt c, cyt a, and cyt a3 arranged in a specific pattern.
* Apart from these protein complexes and enzyme ATP synthase is also present.
* ATP synthase help in the production of ATP.
* These membranes bound electron carriers passed on the electrons to the other electron carriers until they are finally given to O2 and produce water.

**COMPLEX 1:**

* The NADH is in reduce form and is highly energetic so it will give its electrons to the complex 1 molecule of protein and itself convert into NAD+  form.
* In this transferring of electrons, most of the energy is released and the free H+  ions from the matrix is transfer to inter membrane space.
* The complex 1 molecule transfer its electron to the coenzyme Q which is present between complex 1 and 2 molecule.
* Complex 1 molecule itself get oxidized and reduce the coenzyme Q.
* It is not much energetic as NADH so no H+ ion transfer from matrix to the inner membranal space.

**COMPLEX 2:**

* Now, the most energetic molecule FADH2 get oxidize and reduce the complex 2 molecule by giving its electrons and convert itself into FADH form.
* The electrons from complex 2 transfer to coenzyme Q and it transfer the electrons to complex 3 and finally reach to the complex 4.
* No H+ ions are transported to the inter membrane space in this process.

**COMPLEX 3:**

* The Coenzyme Q itself get oxidized by giving electrons to the complex 3 molecule and reduce it.
* This process releases energy which transfer the H+ ion from matrix to the inter membranal space.
* The complex 3 transfer its electrons to the cytrochrome and itself get oxidize.
* This redox rxn do not produce as much energy, so that the H+ ion do not transfer to the inter membranal space.

**COMPLEX 4:**

* In the next step the cytochrome will lose electrons and transfer it to the complex 4 in order to reduce it.
* Again more energy will produce in this redox rxn which helps in releases of the H+ ion from matrix to the inter membranal space.

**DIFFERENCE BETWEEN NADH AND FADH2 IN TRANSFER OF ELECTRONS:**

* In this redox rxn the energy is releases in each transfer of electrons and the transferring of H+  ion takes place from matrix to the inter membranal space.
* The difference is that the NADH transfer electrons to the complex 1 molecule and FADH2 transfer its electrons to complex 3 molecules.